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(54) STERILIZING METHOD OF LIQUID AND STERILIZING BODY

(57) Abstract:

PROBLEM TO BE SOLVED: To make directly sterilizable a liquid by eluting silver ions to the liquid in a moderate proportion by sterilizing the liquid by keeping a silver oxide powder in floating state in the liquid and eluting the silver ions to the liquid while the liquid to be sterilized is passed.

SOLUTION: The silver oxide powder is kept in floating state in a flowing liquid. In this case, the silver oxide power is housed in a liquid permeable housing body, for example a bag of a texture having a fixed mesh, and the powder is immersed in the liquid together with the housing body in order to keep the silver oxide powder in the floating state. And the silver oxide powder is constituted with the primary particles having $\gtrsim$8 micron and/or $\leq$25 micron particle size, moreover, the power is crystalline favorably. An eluting property to the liquid and a durability of the elution of the silver oxide powder are kept moderately by using such a powder, and also the elution of the silver oxide powder itself out of the housing body is prevented by using the liquid permeable housing body having a moderate mesh.

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CLAIMS

[Claim(s)]
[Claim 1] The sterilization approach of a liquid characterized by maintaining silver-oxide powder in the state of floating into this liquid, making complex ion eluted in a liquid, and sterilizing this liquid, circulating the liquid which should carry out sterilization processing.
[Claim 2] The sterilization approach according to claim 1 which carries out hold maintenance of the above-mentioned silver-oxide powder at the hold object of dipping nature, and is characterized by dipping this hold object into a liquid.
[Claim 3] The sterilization approach according to claim 1 or 2 characterized by the above-mentioned silver-oxide powder consisting of particle size (8 microns or more and/or 25 microns or less) of a primary particle.
[Claim 4] The sterilization approach given in claim 1 characterized by the above-mentioned silver-oxide powder being crystallinity thru/or any 1 term of 3.
[Claim 5] The sterilization object of the liquid characterized by coming to provide the maintenance means which maintains silver-oxide powder in the state of floating into the liquid which is made to circulate, and which should carry out sterilization processing.
[Claim 6] The sterilization object according to claim 5 characterized by the above-mentioned maintenance means consisting of a hold object of the dipping nature which held silver-oxide powder.
[Claim 7] The sterilization object according to claim 5 or 6 characterized by the above-mentioned silver-oxide powder consisting of particle size (8 microns or more and/or 25 microns or less) of a primary particle.
[Claim 8] A sterilization object given in claim 5 characterized by the above-mentioned silver-oxide powder being crystallinity thru/or any 1 term of 7.
[Claim 9] A sterilizer given in claim 5 characterized by a hold object being a bag body which has an opening (about 5 microns thru/or about 20 microns) thru/or any 1 term of 8.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Generally this invention relates to the sterilization approach of a liquid, and a sterilization object, it is used in order to sterilize the JIONERA bacillus which breeds in more detail in a liquid like circulating water in the cooling tower of a cooler exterior unit, and it relates to the suitable sterilization approach and a sterilization object.
[0002]
[Description of the Prior Art] It is well known from the former that complex ion has antibacterial, and equipment is proposed by antibacterial [many] and the sterilization approach list using this property. For example, the antimicrobial agent which made the metal which has antibacterial actions, such as silver, on the front face of the aluminum oxide in alumina sol, or its compound adhere to JP,1-258792,A is indicated. Moreover, the approach of adding a silver oxide directly in treated water, and carrying out sterilization processing is indicated by JP,2-290291,A.
[0003]
[Problem(s) to be Solved by the Invention] However, it needs the device for taking large surface area for the top where a germicidal action is late, and when only sterilization of the front face of the structure is moreover expectable and the whole liquid needs to be sterilized, using is difficult for the former approach to which an antimicrobial agent is made to adhere on the surface of something. Moreover, since the process to which an antimicrobial agent is made to adhere is required, there is also a difficulty that cost increases.
[0004] Moreover, although it is thought that remarkable effectiveness can be expected, the approach of the latter which adds a silver oxide directly in treated water is not necessarily the approach of using easily, when sterilizing the JIONERA bacillus which breeds in a liquid like circulating water in the cooling tower of a cooler exterior unit. That is, if it is difficult to control the amount of the silver oxide to add by this approach and an addition becomes excessive, the silver oxide itself will float and flow out, and this adheres to equipment and materials and produces nonconformity, such as producing plugging. Moreover, if people touch a direct liquid or drink this, the silver oxide which floated will be taken in and it is not desirable from the insurance of the body.
[0005] This invention sets it as the main object to offer the sterilization approach of a liquid and sterilization object which it was made in view of the above-mentioned situation, there are no above nonconformities seen in the conventional technique, and complex ion is made eluted in liquid at a moderate rate, and can sterilize a liquid directly. As for other objects of this invention, a bactericidal effect also has the silver-oxide powder of a constant rate in offering the sterilization approach and sterilization object which are maintained considerably [long duration]. Moreover, this invention aims to let handling offer the sterilization approach and sterilization object which also set in the easy existing cistern etc., and can be applied or used simple.
[0006]
[Means for Solving the Problem and its Function] It is characterized by maintaining silver-oxide powder

in the state of floating into this liquid, making complex ion eluted in a liquid, and sterilizing this liquid, circulating the liquid which should carry out sterilization processing in the sterilization approach of the liquid of this invention, in order to attain the above-mentioned object. If silver-oxide powder is dipped into the liquid, complex ion will be eluted, this will make a germicidal action, but if silver-oxide powder is made to flow out by the flow of a liquid, sufficient sterilizing properties are [/ long duration] unmaintainable. For this reason, by the approach of this invention, silver-oxide powder is maintained in the state of floating into a liquid with flow. Although what kind of means may be used here in order to maintain silver-oxide powder at such a floating condition, it is simplest to take the approach of carrying out hold maintenance and dipping silver-oxide powder in the hold object of dipping nature, for example, the bag body of a fixed mesh, into a liquid this whole hold object, and it is desirable.

[0007] Moreover, as for silver-oxide powder, it is desirable to constitute from a primary particle with a particle size [of 8 microns or more] and/or a particle size of 25 microns or less, and it is advantageous that it is a further crystalline thing. If it is such silver-oxide powder, when the elution nature to the inside of the liquid of silver-oxide powder and the durability of elution will be kept moderate, runoff to the hold outside of the body of the silver-oxide powder itself can be prevented by using the hold object of the water flow nature which is a moderate mesh.

[0008] On the other hand, the sterilization object of the liquid of this invention is characterized by coming to provide the maintenance means which maintains silver-oxide powder in the state of floating into the liquid which is made to circulate, and which should carry out sterilization processing. As for a maintenance means, it is practical to constitute from a hold object of the dipping nature which held silver-oxide powder here, and as stated previously, silver-oxide powder consists of a primary particle with a particle size [of 8 microns or more], and/or a particle size of 25 microns or less, and it is desirable that it is crystallinity. Furthermore, as for a hold object, it is desirable to consider as the bag body which has an opening (about 5 microns thru/or about 20 microns). although it comes out that whenever [opening / of a hold object] is what is appropriately chosen according to the particle size of silver-oxide powder from the first, when the particle size of silver-oxide powder is in the above suitable range, whenever [opening / of a hold object] can be made into magnitude of this level.

[0009]

[Embodiment of the Invention] Below, the gestalt of operation of this invention is explained at a detail. As mentioned above, circulating the liquid which should carry out sterilization processing, the sterilization approach of the liquid of this invention maintains silver-oxide powder in the state of floating into this liquid, makes complex ion eluted in a liquid, and sterilizes this liquid. Although the liquid made into the object of sterilization in this invention is a liquid with the liquid or a possibility of breeding that bacteria, such as a JIONERA bacillus, Escherichia coli, and Staphylococcus aureus, may breed, especially the class is not limited concretely. However, for example, this invention is made like circulating water in the cooling tower of a cooler exterior unit supposing the case where the liquid with which bacteria, such as a JIONERA bacillus, breed in a liquid is sterilized.

[0010] In such an object, silver-oxide powder makes strong sterilization and antibacterial action. The experimental result which this invention person etc. performed is summarized to a degree that this should be checked.

[0011] Escherichia coli and Staphylococcus aureus were chosen as [fundamental experiment about sterilization capacity] trial strain, and the sterilization capacity of silver-oxide powder was investigated by the shake flask method. That is, the blank sample which added only the fungus without adding the sample which added the fungus liquid of Escherichia coli or Staphylococcus aureus by sterilization ending, respectively to the Erlenmeyer flask made from Pyrex of 300ml capacity containing 75ml of distilled water, and added 0.74g of silver-oxide powder, and silver-oxide powder was created, and shaking culture of these was carried out by 30 degrees C and 150rpm. And the number of micro organisms was investigated about each sample and blank sample by which silver-oxide powder was added at the event in after [shaking initiation] 30 minutes, this 1 hour, and these 24 hours at the event before shaking initiation. The result is shown in the following table 1.

[0012]

[A table·1]

	大腸菌（個/ml）		黄色ブドウ状球菌（個/ml）	
振とう時間	酸化銀	ブランク	酸化銀	ブランク
0時間	6.5×10^5	3.8×10^5	1.7×10^5	2.0×10^5
30分	3.4×10^2	4.1×10^5	8.6×10	1.3×10^5
1時間	0	5.3×10^5	0	9.5×10^4
24時間	0	3.8×10^8	0	6.1×10^4

[0013] If each fungus decreases remarkably and moreover increases shaking time amount as compared with the case where it is not adding if silver-oxide powder is added so that this result may show, that reduction degree will become more remarkable.

[0014] Although complex ion is made eluted from a silver oxide by the approach of this invention while silver-oxide powder is maintained in the state of floating into a liquid with flow and silver-oxide powder is made not to pour by the flow of a liquid In order for silver-oxide powder not to be made to flow out by the flow of a liquid, hold maintenance is carried out and silver-oxide powder is dipped in the hold object of dipping nature, and the bag body of a mesh fixed on a concrete target into a liquid this whole hold object. Here, the hold object of dipping nature need to be moreover to some extent strong, the bag body built with a bicomponent fiber cloth which be use for the tea bag etc., Japanese paper, etc. constitute it, it attach a string etc. in this bag body, fix the end to fixed parts, such as a cistern, possible [engaging and releasing], and hold a bag body in the state of floating in liquid without make the powder particle-like silver oxide flow out outside.

[0015] As silver-oxide powder, a mesh eye is passed from the above-mentioned bag body, and it does not flow out outside upwards, and the solubility to liquid is not superfluous, either and what minute amount past ****** does not have, either must be chosen. As such silver-oxide powder, particle size is the crystalline thing which gathered greatly, and chooses what consists of particle size (8 thru/or 25 microns) of primary particles. What could manufacture the powder of such a silver oxide by hydrolyzing the particle of a silver oxide by lye, for example, these people indicated in Japanese Patent Application No. No. 180575 [nine to] can be used.

[0016] If the thing of about 10-micron opening is suitable and holds in such a bag body as an above-mentioned bag body which holds such silver-oxide powder, it will be promptly eluted until a silver oxide becomes the fixed concentration which is about dozens of ppm in the water which passes this, and a bactericidal effect will be underwater demonstrated as complex ion.

[0017] On the other hand, the sterilization object of the liquid of this invention possesses the maintenance means which maintains silver-oxide powder in the state of floating into the liquid which is made to circulate, and which should carry out sterilization processing, and this maintenance means is the hold object of the dipping nature which held silver-oxide powder, and is already explained in the above. the location where circulating water inside a cooling tower circulates when sterilizing the JIONERA bacillus which breeds in circulating water in the cooling tower of a cooler exterior unit, for example, although the sterilization object of this invention may be used for what kind of location -- 1 -- or more than one are arranged. Anchoring attaches a string to a bag body, uses suitable fixed means, such as a

hook, for a cooling tower wall, demounts a string's end, and should just fix it free. Moreover, although the sterilization object which performed the fixed germicidal action needs to fill this up in order for the silver-oxide particle in a bag body to decrease, it removes a string from a hook etc. in that case, takes out a bag body outside a cooling tower, and fills up silver-oxide powder in a bag body.
[0018]
[Effect of the Invention] As mentioned above, since maintain silver-oxide powder in the state of floating into this liquid, complex ion is made eluted in a liquid and this liquid is sterilized, circulating the liquid which should carry out sterilization processing with the sterilization approach of this invention, and a sterilization object, there is no nonconformity seen in the conventional technique, complex ion is made eluted in liquid at a moderate rate, and a liquid can be sterilized directly and effectively. Moreover, with the sterilization approach of this invention, and a sterilization object, when a bactericidal effect can cover a long time and can make it also maintain the silver-oxide powder of a constant rate considerably, handling also sets in the easy existing cistern etc., and can apply or use simple.
[0019]
[Example] Although an example explains this invention to a detail further hereafter, as for these examples, it is undoubted that it is not what restricts the range of this invention.
[0020] In order to prove the bactericidal effect of the sterilization object of this invention over generating of the bacteria in a [example 1] water tank, it experimented using the 20l. tank which opened the top cover. In the experiment, it was made to sterilize using the various conventional sterilization objects it is supposed that there is a bactericidal effect in addition to the sterilization object of this invention, and with time, spacing was opened, the amount of the Escherichia coli which exists in liquid was measured, and the bactericidal effect was investigated. The conditions of an experiment are as follows.
Using agency water: River water Fungus: In order to see effectiveness promptly, 3. 0X103 Escherichia Coli/Ml Addition Ambient atmosphere : It is left to the outdoors. Sterilization object of this invention: Silver-oxide mean particle diameter 14.5micro The amount of silver oxides 10g Comparison sterilization object: Zeolite 100g Silver anode plate electrolysis JP,50-32764,A -- a publication -- [0021] by the **** approach The result of the above-mentioned experiment is shown in a table 2.
[A table 2]

細菌量	日数		
	1ヶ月	3ヶ月	6ヶ月
本発明殺菌体	0	0	0
ゼオライト	4.0×10^3	1.5×10^4	6.5×10^2
銀陽極電解による方法	2.5×10^2	5.5×10	4.5×10^2

The above-mentioned result shows that it can compare with the conventional approach and can sterilize very effectively if the sterilization object of this invention is used.
[0022] The comparative experiments about the bactericidal effect by the particle size of [example 2] silver-oxide powder were conducted. That is, while preparing the tank (100l. capacity) which equipped the pars-basilaris-ossis-occipitalis side with the tap hole, opening the top cover and carrying out insertion arrangement of the agitator from the upper part, the processed water which flowed from the upper part was discharged from the tap hole using the pump. And the sterilization object of this

invention is hung from the top-cover section, and it considers as a floating condition into circulating water, and river water was made to flow using a pump, operating an agitator and stirring on continuation or an intermittent target (a part for 200 cc/). Moreover, constant-rate mixing of the Escherichia coli was beforehand carried out into river water. And various kinds of silver oxides with which particle size differs, i.e., particle size, hung in the tank 1, 5, 8, and each sterilization object that used the various silver oxides it is [silver oxides] 15 or 25 microns the constant rate (10g), it made it sterilize under the same conditions, and each bactericidal effect was compared.

[0023] The result is shown in the following table 3.

[A table 3]

酸化銀粒径（μm）	大腸菌の量（個／ml）			
	1日	1週間	3ヶ月	6ヶ月
25	1.5×10^3	5.0×10^2	3.2×10	2.0×10
15	6.5×10^2	8.5×10	0	0
8	8.0×10^2	4.0×10	1.5×10	2.1×10
5	1.2×10^2	3.5×10	3.0×10^4	1.5×10^4
1	7×10	3.0×10^3	2.5×10^4	2.0×10^4

[0024] Even if a bactericidal effect is not enough at the beginning if particle size becomes 8 microns or more while a bactericidal effect will no longer be acquired from it if it passes with three months and six months although a bactericidal effect will be comparatively acquired from the above-mentioned result at the beginning, if particle size becomes small with 5 microns or 1 micron, things understand that a bactericidal effect increases in connection with the passage of time, and it continues.

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TECHNICAL FIELD

[Field of the Invention] Generally this invention relates to the sterilization approach of a liquid, and a sterilization object, it is used in order to sterilize the JIONERA bacillus which breeds in more detail in a liquid like circulating water in the cooling tower of a cooler exterior unit, and it relates to the suitable sterilization approach and a sterilization object.

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PRIOR ART

[Description of the Prior Art] It is well known from the former that complex ion has antibacterial, and equipment is proposed by antibacterial [many] and the sterilization approach list using this property. For example, the antimicrobial agent which made the metal which has antibacterial actions, such as silver, on the front face of the aluminum oxide in alumina sol, or its compound adhere to JP,1-258792,A is indicated. Moreover, the approach of adding a silver oxide directly in treated water, and carrying out sterilization processing is indicated by JP,2-290291,A.

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EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, since maintain silver-oxide powder in the state of floating into this liquid, complex ion is made eluted in a liquid and this liquid is sterilized, circulating the liquid which should carry out sterilization processing with the sterilization approach of this invention, and a sterilization object, there is no nonconformity seen in the conventional technique, complex ion is made eluted in liquid at a moderate rate, and a liquid can be sterilized directly and effectively. Moreover, with the sterilization approach of this invention, and a sterilization object, when a bactericidal effect can cover a long time and can make it also maintain the silver-oxide powder of a constant rate considerably, handling also sets in the easy existing cistern etc., and can apply or use simple.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, it needs the device for taking large surface area for the top where a germicidal action is late, and when only sterilization of the front face of the structure is moreover expectable and the whole liquid needs to be sterilized, using is difficult for the former approach to which an antimicrobial agent is made to adhere on the surface of something. Moreover, since the process to which an antimicrobial agent is made to adhere is required, there is also a difficulty that cost increases.
[0004] Moreover, although it is thought that remarkable effectiveness can be expected, the approach of the latter which adds a silver oxide directly in treated water is not necessarily the approach of using easily, when sterilizing the JIONERA bacillus which breeds in a liquid like circulating water in the cooling tower of a cooler exterior unit. That is, if it is difficult to control the amount of the silver oxide to add by this approach and an addition becomes excessive, the silver oxide itself will float and flow out, and this adheres to equipment and materials and produces nonconformity, such as producing plugging. Moreover, if people touch a direct liquid or drink this, the silver oxide which floated will be taken in and it is not desirable from the insurance of the body.
[0005] This invention sets it as the main object to offer the sterilization approach of a liquid and sterilization object which it was made in view of the above-mentioned situation, there are no above nonconformities seen in the conventional technique, and complex ion is made eluted in liquid at a moderate rate, and can sterilize a liquid directly. As for other objects of this invention, a bactericidal effect also has the silver-oxide powder of a constant rate in offering the sterilization approach and sterilization object which are maintained considerably [long duration]. Moreover, this invention aims to let handling offer the sterilization approach and sterilization object which also set in the easy existing cistern etc., and can be applied or used simple.

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OPERATION

[Means for Solving the Problem and its Function] It is characterized by maintaining silver-oxide powder in the state of floating into this liquid, making complex ion eluted in a liquid, and sterilizing this liquid, circulating the liquid which should carry out sterilization processing in the sterilization approach of the liquid of this invention, in order to attain the above-mentioned object. If silver-oxide powder is dipped into the liquid, complex ion will be eluted, this will make a germicidal action, but if silver-oxide powder is made to flow out by the flow of a liquid, sufficient sterilizing properties are [/ long duration] unmaintainable. For this reason, by the approach of this invention, silver-oxide powder is maintained in the state of floating into a liquid with flow. Although what kind of means may be used here in order to maintain silver-oxide powder at such a floating condition, it is simplest to take the approach of carrying out hold maintenance and dipping silver-oxide powder in the hold object of dipping nature, for example, the bag body of a fixed mesh, into a liquid this whole hold object, and it is desirable.
[0007] Moreover, as for silver-oxide powder, it is desirable to constitute from a primary particle with a particle size [of 8 microns or more] and/or a particle size of 25 microns or less, and it is advantageous that it is a further crystalline thing. If it is such silver-oxide powder, when the elution nature to the inside of the liquid of silver-oxide powder and the durability of elution will be kept moderate, runoff to the hold outside of the body of the silver-oxide powder itself can be prevented by using the hold object of the water flow nature which is a moderate mesh.
[0008] On the other hand, the sterilization object of the liquid of this invention is characterized by coming to provide the maintenance means which maintains silver-oxide powder in the state of floating into the liquid which is made to circulate, and which should carry out sterilization processing. As for a maintenance means, it is practical to constitute from a hold object of the dipping nature which held silver-oxide powder here, and as stated previously, silver-oxide powder consists of a primary particle with a particle size [of 8 microns or more], and/or a particle size of 25 microns or less, and it is desirable that it is crystallinity. Furthermore, as for a hold object, it is desirable to consider as the bag body which has an opening (about 5 microns thru/or about 20 microns). although it comes out that whenever [opening / of a hold object] is what is appropriately chosen according to the particle size of silver-oxide powder from the first, when the particle size of silver-oxide powder is in the above suitable range, whenever [opening / of a hold object] can be made into magnitude of this level.
[0009]
[Embodiment of the Invention] Below, the gestalt of operation of this invention is explained at a detail. As mentioned above, circulating the liquid which should carry out sterilization processing, the sterilization approach of the liquid of this invention maintains silver-oxide powder in the state of floating into this liquid, makes complex ion eluted in a liquid, and sterilizes this liquid. Although the liquid made into the object of sterilization in this invention is a liquid with the liquid or a possibility of breeding that bacteria, such as a JIONERA bacillus, Escherichia coli, and Staphylococcus aureus, may breed, especially the class is not limited concretely. However, for example, this invention is made like circulating water in the cooling tower of a cooler exterior unit supposing the case where the liquid with which bacteria, such as a JIONERA bacillus, breed in a liquid is sterilized.

[0010] In such an object, silver-oxide powder makes strong sterilization and antibacterial action. The experimental result which this invention person etc. performed is summarized to a degree that this should be checked.
[0011] Escherichia coli and Staphylococcus aureus were chosen as [fundamental experiment about sterilization capacity] trial strain, and the sterilization capacity of silver-oxide powder was investigated by the shake flask method. That is, the blank sample which added only the fungus without adding the sample which added the fungus liquid of Escherichia coli or Staphylococcus aureus by sterilization ending, respectively to the Erlenmeyer flask made from Pyrex of 300ml capacity containing 75ml of distilled water, and added 0.74g of silver-oxide powder, and silver-oxide powder was created, and shaking culture of these was carried out by 30 degrees C and 150rpm. And the number of micro organisms was investigated about each sample and blank sample by which silver-oxide powder was added at the event in after [shaking initiation] 30 minutes, this 1 hour, and these 24 hours at the event before shaking initiation. The result is shown in the following table 1.
[0012]
[A table 1]

	大腸菌（個/ml）		黄色ブドウ状球菌（個/ml）	
振とう時間	酸化銀	ブランク	酸化銀	ブランク
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1時間	0	5.3×10^5	0	9.5×10^4
24時間	0	3.8×10^8	0	6.1×10^4

[0013] If each fungus decreases remarkably and moreover increases shaking time amount as compared with the case where it is not adding if silver-oxide powder is added so that this result may show, that reduction degree will become more remarkable.
[0014] While silver-oxide powder is maintained in the state of floating into a liquid with flow by the approach of this invention and silver-oxide powder is made not to pour by the flow of a liquid, although it divides and comes out, in order [which makes complex ion eluted from a silver oxide] for silver-oxide powder not to be made to flow out by the flow of a liquid -- silver-oxide powder -- the hold object of dipping nature -- hold maintenance is carried out and it specifically dips in the bag body of a fixed mesh into a liquid this whole hold object. Here, the hold object of dipping nature need to be moreover to some extent strong, the bag body built with a bicomponent fiber cloth which be use for the tea bag etc., Japanese paper, etc. constitute it, it attach a string etc. in this bag body, fix the end to fixed parts, such as a cistern, possible [engaging and releasing], and hold a bag body in the state of floating in liquid without make the powder particle-like silver oxide flow out outside.
[0015] As silver-oxide powder, a mesh eye is passed from the above-mentioned bag body, and it does not flow out outside upwards, and the solubility to liquid is not superfluous, either and what minute amount past ****** does not have, either must be chosen. As such silver-oxide powder, particle size is the crystalline thing which gathered greatly, and chooses what consists of particle size (8 thru/or 25 microns) of primary particles. What could manufacture the powder of such a silver oxide by hydrolyzing

the particle of a silver oxide by lye, for example, these people indicated in Japanese Patent Application No. No. 180575 [nine to] can be used.
[0016] If the thing of about 10-micron opening is suitable and holds in such a bag body as an above-mentioned bag body which holds such silver-oxide powder, it will be promptly eluted until a silver oxide becomes the fixed concentration which is about dozens of ppm in the water which passes this, and a bactericidal effect will be underwater demonstrated as complex ion.
[0017] On the other hand, the sterilization object of the liquid of this invention possesses the maintenance means which maintains silver-oxide powder in the state of floating into the liquid which is made to circulate, and which should carry out sterilization processing, and this maintenance means is the hold object of the dipping nature which held silver-oxide powder, and is already explained in the above. the location where circulating water inside a cooling tower circulates when sterilizing the JIONERA bacillus which breeds in circulating water in the cooling tower of a cooler exterior unit, for example, although the sterilization object of this invention may be used for what kind of location -- 1 -- or more than one are arranged. Anchoring attaches a string to a bag body, uses suitable fixed means, such as a hook, for a cooling tower wall, demounts a string's end, and should just fix it free. Moreover, although the sterilization object which performed the fixed germicidal action needs to fill this up in order for the silver-oxide particle in a bag body to decrease, it removes a string from a hook etc. in that case, takes out a bag body outside a cooling tower, and fills up silver-oxide powder in a bag body.

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EXAMPLE

[Example] Although an example explains this invention to a detail further hereafter, as for these examples, it is undoubted that it is not what restricts the range of this invention.
[0020] In order to prove the bactericidal effect of the sterilization object of this invention over generating of the bacteria in a [example 1] water tank, it experimented using the 20l. tank which opened the top cover. In the experiment, it was made to sterilize using the various conventional sterilization objects it is supposed that there is a bactericidal effect in addition to the sterilization object of this invention, and with time, spacing was opened, the amount of the Escherichia coli which exists in liquid was measured, and the bactericidal effect was investigated. The conditions of an experiment are as follows.
Using agency water: River water Fungus: In order to see effectiveness promptly, 3. 0X103 Escherichia Coli/Ml Addition Ambient atmosphere : It is left to the outdoors. Sterilization object of this invention: Silver-oxide mean particle diameter 14.5micro The amount of silver oxides 10g Comparison sterilization object: Zeolite 100g Silver anode plate electrolysis JP,50-32764,A -- a publication -- [0021] by the **** approach The result of the above-mentioned experiment is shown in a table 2.
[A table 2]

細菌量	日数		
	1ヶ月	3ヶ月	6ヶ月
本発明殺菌体	0	0	0
ゼオライト	4.0×10^3	1.5×10^4	6.5×10^2
銀陽極電解による方法	2.5×10^2	5.5×10	4.5×10^2

The above-mentioned result shows that it can compare with the conventional approach and can sterilize very effectively if the sterilization object of this invention is used.
[0022] The comparative experiments about the bactericidal effect by the particle size of [example 2] silver-oxide powder were conducted. That is, while preparing the tank (100l. capacity) which equipped the pars-basilaris-ossis-occipitalis side with the tap hole, opening the top cover and carrying out insertion arrangement of the agitator from the upper part, the processed water which flowed from the upper part was discharged from the tap hole using the pump. And the sterilization object of this invention is hung from the top-cover section, and it considers as a floating condition into circulating

water, and river water was made to flow using a pump, operating an agitator and stirring on continuation or an intermittent target (a part for 200 cc/). Moreover, constant-rate mixing of the Escherichia coli was beforehand carried out into river water. And various kinds of silver oxides with which particle size differs, i.e., particle size, hung in the tank 1, 5, 8, and each sterilization object that used the various silver oxides it is [silver oxides] 15 or 25 microns the constant rate (10g), it made it sterilize under the same conditions, and each bactericidal effect was compared.

[0023] The result is shown in the following table 3.

[A table 3]

酸化銀粒径（μm）	大腸菌の量（個／ml）			
	1日	1週間	3ヶ月	6ヶ月
25	1.5×10^3	5.0×10^2	3.2×10	2.0×10
15	6.5×10^2	8.5×10	0	0
8	8.0×10^2	4.0×10	1.5×10	2.1×10
5	1.2×10^2	3.5×10	3.0×10^4	1.5×10^4
1	7×10	3.0×10^3	2.5×10^4	2.0×10^4

[0024] Even if a bactericidal effect is not enough at the beginning if particle size becomes 8 microns or more while a bactericidal effect will no longer be acquired from it if it passes with three months and six months although a bactericidal effect will be comparatively acquired from the above-mentioned result at the beginning, if particle size becomes small with 5 microns or 1 micron, things understand that a bactericidal effect increases in connection with the passage of time, and it continues.

[Translation done.]